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Short communication

Risk factors for developing posttraumatic stress disorder following childbirth

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ABSTRACT

Women can develop childbirth-related posttraumatic stress disorder (CB-PTSD) in at-term delivery with healthy baby outcome as well as following pre-term delivery and neonatal complications, a potential added stressor. No study compares risk factors of CB-PTSD associated with different infant outcomes. We investigated CB-PTSD risk factors by comparing women with or without neonatal complications. Analysis reveals the importance of antepartum and birth-related risk factors in CB-PTSD above and beyond child outcomes, suggesting childbirth is an independent stressor capable of evoking CB-PTSD.

1. Introduction

Childbirth entails positive and negative psychological outcomes (Dekel et al. 2019a; Taubman Ben-Ari et al., 2019). Mothers may exhibit posttraumatic stress response following a traumatic childbirth with or without complications in infant medical health. A significant minority may develop childbirth-related posttraumatic stress disorder (CB-PTSD), with as many as one quarter reporting clinically significant CB-PTSD symptoms (Dekel et al. 2017). CB-PTSD may interfere with maternal bonding (Dekel et al., 2019b) breastfeeding, and child development (Cook et al. 2018), to the detriment of the child (Dekel et al., 2019d).

Identified factors linked with CB-PTSD pertain to premorbid factors, such as demographics (e.g., maternal age), maternal psychological vulnerability, prior trauma history, and also peritraumatic event factors concerning traumatic birth-related stressors (Ayers et al. 2016; Ayers 2017). Deliveries resulting in newborn admission to the neonatal intensive care unit (NICU) may be viewed as post-trauma stressors further triggering CB-PTSD (Dekel et al., 2019c). It remains unclear whether factors associated with CB-PTSD with neonatal complications are identical to those in deliveries with healthy child outcomes. Similar risk factors would support childbirth experience as the index traumatic stressor. Such comparison would clarify the role of the childbirth stressor in CB-PTSD beyond related stressors.

This study aims to compare pre-pregnancy, delivery, and childbirth-related risk factors associated with CB-PTSD in women who gave birth at-term and had healthy baby outcomes versus those who gave birth to a baby with complications requiring neonatal intensive care unit (NICU) admission. If childbirth is indeed a stressor capable of triggering CB-PTSD, then we hypothesize to find mostly shared risk factors.

2. Methods

2.1. Participants

This study is part of a study on psychological outcomes of childbirth (Dekel et al., 2019c, 2019d). Study recruitment was via announcements on postpartum websites. Participants completed an anonymous survey about their childbirth and mental health on average 3 months following childbirth (SD = 1.5). Partners Human Research Committee determined exemption.

In the final sample of 685 women, participants were 31 years of age (SD = 4.80); middle class (median income = $50,000-$99,000); married (93%); had at least college education (71%); resided in North America (66%); and 12% were ethnic or racial minorities. Around half were primiparas (56%); 64% delivered vaginally.

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Table 1
Factors predicting CB-PTSD by birth neonatal outcome

	Complications				Healthy (no complications)				Statistics		
	CB-PTSD		no CB-PTSD		CB-PTSD		no CB-PTSD				
	M / %	SD	M / %	SD	M / %	SD	M / %	SD	Complications	CB-PTSD	Complications X CB-PTSD
Maternal age	30.09	4.83	31.67	6.09	30.86	5.14	31.65	4.87	0.46	4.60*	0.51
Married vs. Single	9.3		6.9		7.5		4.5		0.01	0.00	0.75
Education level	2.78	0.99	2.90	0.96	2.87	1.08	3.12	1.03	2.27	3.31	0.40
Income	1.73	0.87	2.06	1.01	1.83	1.00	2.14	0.95	0.83	10.43**	0.01
Primiparous vs. multiparous	58.1		63.4		59.1		53.1		3.84*	0.99	2.11
History of trauma	18.33	4.24	16.97	6.55	18.09	3.90	15.96	7.01	0.90	6.99**	0.35
Pre-childbirth mental health problems	62.8		43.6		63.4		36.6		2.25	19.08***	0.31
Pre-childbirth PTSD	16.3		8.2		19.4		4.7		2.11	22.34***	1.69
Previous childbirth stressors	4.50	0.97	3.60	1.35	3.61	1.34	3.21	1.25	4.79*	4.95*	0.73
Planned pregnancy	72.1		69.3		61.3		77.9		3.36	12.22***	4.01*
Fertility treatment	9.3		12.9		12.9		10.9		2.85	2.53	2.99
Sleep deprivation at time of delivery	86.0		67.3		87.1		60.7		2.19	22.48***	1.52
Duration between labor start and birth	19.76	19.87	19.23	39.92	27.95	71.82	12.57	14.90	0.05	5.47*	4.77*
Degree of pain in labor	3.35	1.38	3.28	1.40	3.69	1.41	3.41	1.32	2.95	1.55	0.63
Medication for pain	90.7		78.2		76.3		73.2		1.84	0.68	1.01
Medication for labor induction	53.5		37.6		57.0		39.5		0.04	9.38**	0.00
Childbirth-related peritraumatic distress	29.19	9.02	17.50	10.90	29.43	10.90	11.71	10.27	6.55*	183.65***	7.72**
Childbirth-related peritraumatic dissociation	21.76	10.20	9.88	8.24	20.26	10.34	7.63	8.25	4.16*	178.33***	0.17
Preferred mode of delivery	16.3		47.5		40.9		61.8		5.53*	16.33***	0.39
Degree of pain in delivery	2.57	1.54	2.67	1.46	3.01	1.62	2.66	1.36	2.11	0.77	2.41
Natural vs. Vaginal	16.3		35.6		30.1		37.3		0.54	0.06	0.00
Natural vs. Assisted	9.3		5.9		8.6		6.9		0.98	1.58	0.12
Natural vs. Cesarean	14.0		19.8		18.3		19.9		1.71	0.98	0.19
Natural vs. Emergency Cesarean	53.5		22.8		25.8		9.8		5.10*	5.85*	0.06
Obstetric complications in birth	76.7		56.4		75.3		36.6		12.94***	43.78***	3.25
Singleton vs. multiple births	20.9		16.8		14.0		11.6		3.49	0.59	0.04
Weight of newborn	6.79	1.64	6.81	1.74	7.69	1.01	7.72	1.05	48.62***	0.03	0.01
Skin-to-skin contact	32.6		57.4		64.5		87.1		40.93***	30.90***	0.26
Rooming-in	46.5		41.6		97.8		95.8		129.13***	0.01	0.01
Exclusive breastfeeding vs. other	44.2		46.5		39.8		61.8		9.28**	11.49**	2.34

Note. CB-PTSD = childbirth-related PTSD. Complications = delivery resulting with medical complications in newborn medical healthy or/and prematurity; Healthy = delivery at-term with healthy infant outcomes; statistics are *F* for ANOVA-based analyses for continuous measures (values represented by means) and *Wald* for logistic-based regressions for categorical measures (values represented by %). For example, for maternal age, F value of the main effect for CB-PTSD is significant, indicating that women classified as CB-PTSD were younger in age (based on mean groups) than women who were classified as non-CB-PTSD above and beyond whether they had complications in newborn health. For primiparous (categorial variables indicated as %), the Wald for complications is significant indicating that if you had complications the likelihood of being primiparous is higher, regardless if you endorsed CB-PTSD or not.

* $p < .05$,
** $p < .01$,
*** $p < .001$.

2.2. Measures

Childbirth-related PTSD was assessed with the widely used PTSD checklist for DSM-5 (PCL-5) (Weathers et al., 2015), assessing 20 DSM-5 PTSD symptoms endorsed over 1-month with index event "recent childbirth". To conform to DSM-5, we classified individuals as endorsing probable CB-PTSD by having at least 1 intrusion, 1 avoidance, 2 alterations in cognitions and mood, and 2 reactivity and hyperarousal, with at least moderate symptoms ($\alpha = 0.95$).

Childbirth-related peritraumatic responses included peritraumatic distress ("I felt helpless") and dissociation (e.g., "I felt as though I was watching what was happening to me"). We used the Peritraumatic Distress Inventory (PDI) (Brunet et al. 2001) and Peritraumatic Dissociative Experiences Questionnaire (PDEQ) (Marmar et al. 1997) concerning negative emotional responses "during/or immediately following childbirth" (PDI: $\alpha = 0.89$; PDEQ: $\alpha = 0.91$).

Trauma history was assessed with the commonly used Life Events Checklist for DSM-5 (LEC-5) (Weathers et al. 2013), targeting exposure to a list of potentially traumatic events ($\alpha = 0.86$).

Childbirth-related information was assessed via single items including parity, planned pregnancy, fertility treatment, delivery mode, duration between labor and delivery, degree of pain in labor and delivery (0-4 scale), sleep deprivation (<6hrs), number of fetus, and newborn weight. In response to yes/no questions, we assessed induction medication, obstetrics complication in birth, skin-to-skin contact, breastfeeding, and rooming-in. We assessed previous childbirth stressors (i.e., miscarriage, stillbirth, prematurity) and prior mental health problems (i.e., depression, anxiety, PTSD).

3. Results

Multiple Imputation was utilized to account for missing data (Rubin 2009). 79% ($n = 451$) of the sample had an at-term delivery with a healthy baby outcome, coined "healthy group". 21% ($n = 144$) delivered with newborn medical complications resulting in newborn admission to the neonatal intensive care unit (NICU) and/or prematurity (<37 gestational weeks), coined "complication group".

3.1. CB-PTSD rates by neonatal birth outcome

To examine maternal CB-PTSD rates and compare between the complication and healthy groups, we conducted a chi-square test for independence of measures. The relative risk for the complication group for CB-PTSD was 1.74 (95% confidence interval (CI): 1.27, 2.37) as compared with the healthy group, $\chi^2_{(1)} = 11.48$, $p_{exact} < .0001$ (29.9% CB-PTSD in complications vs. 17.2% in healthy). No group differences were found in risk for CB-PTSD profile (i.e., endorsement of 1-3 symptom cluster(s)).

3.2. CB-PTSD and traumatic childbirth experience by neonatal birth outcome

To assess the association between CB-PTSD and traumatic childbirth by neonatal outcomes, we conducted a series of Pearson correlations between CB-PTSD symptoms and peritraumatic birth responses. Higher peritraumatic response was associated with higher CB-PTSD severity. For neonatal complications, PDI = 0.69, PDEQ = 0.66. For no-complications, PDI = 0.63, PDEQ = 0.59, all p = 0.001. Fisher's Z indicated no significant group differences in intercorrelations magnitude.

3.3. Risk factors of CB-PTSD by neonatal birth outcomes

We examined CB-PTSD risk factors concerning sociodemographic, trauma exposure and prior mental health, and delivery-related factors for the whole sample. Since neonatal birth complications might affect the pattern of results, we included it as a factor in the analyses. We conducted a series of two-way analyses of variance (ANOVA), in which CB-PTSD and complications status were the independent groups, to examine differences in quantitative measures, and logistic regression analyses (binary and multi-nominal) for qualitative measures (Table 1).

For demographic information, results for CB-PTSD status revealed that independent of neonatal complications, women with CB-PTSD were younger and had lower income than the non-CB-PTSD group. They also had more prior traumatic exposure, prior childbirth stressors, and had higher likelihood of prior (non-postpartum) PTSD. For delivery-related factors, the CB-PTSD group had higher peritraumatic dissociation in birth, higher likelihood of sleep deprivation prior to delivery, complications during labor and medication to induce labor, and emergency cesarean than the non-CB-PTSD; and less likely to have planned pregnancy and preferred delivery mode. Regardless of neonatal complications, the CB-PTSD group had lower likelihood for skin-to-skin contact and exclusive breastfeeding than the non-CB-PTSD.

Results for complications status revealed that women who had deliveries resulting in medical complication in newborn regardless of whether they developed CB-PTSD had more previous childbirth stressors, were more likely to be primiparous, had higher peritraumatic dissociation in birth, higher likelihood of emergency cesarean, complications in labor, lower neonatal birth weight, as well as lower likelihood of rooming in, skin-to-skin contact, and exclusive breastfeeding than women with healthy newborns.

The analyses revealed interactions between CB-PTSD and neonatal complications status. In the healthy group, the differences in distress in birth and duration of labor were significantly larger between women with and without CB-PTSD compared to differences between women with and without CB-PTSD in cases of newborn complications.

4. Discussion

The notion that childbirth experience can be stressful enough to result in the manifestation of a posttraumatic stress response following parturition is receiving growing attention. Our findings reveal that demographic, history of maternal mental health, and childbirth stressor-related factors are important in ensuing CB-PTSD. This accords with the model of diathesis stress where interaction between one's vulnerabilities and environmental stress predict the disease's outcome.

Importantly, the same birth factors appear to give rise to CB-PTSD in cases of deliveries with healthy infant outcomes as well as in cases with the added trauma of infant health complications. This underscores the trauma of childbirth and the stressful aspects of the delivery itself in CB-PTSD etiology, independent of newborn complications. Treatment that considers the traumatic exposure of childbirth appears relevant for both conditions.

We found that regardless of whether childbirth results in medical complications in the baby, women classified with CB-PTSD were younger, less educated, and had prior mental health vulnerability and trauma history to non-CB-PTSD women. We also found that having an emergency cesarean, obstetric complications in birth, and medication for birth induction were risk factors of CB-PTSD, as well as sleep deprivation before giving birth. Women with CB-PTSD were less likely to engage in skin-to-skin and exclusive breastfeeding unrelated to medical complications in the baby, which accords with observed maternal bonding impairment in CB-PTSD (Dekel et al., 2019b). The latter finding emphasizes the need for CB-PTSD interventions addressing maternal attachment difficulties to improve child outcomes.

Having a traumatic stress response to birth was a strong indicator of CB-PTSD among women with term deliveries resulting in healthy baby outcomes. Our findings suggest that screening for acute stress response following term-delivery might be a useful clinical tool.

We also found that some factors implicated in CB-PTSD are associated with deliveries with newborn medical complications (e.g., obstetrical complications in birth, emergency cesarean) in the absence of CB-PTSD. Thus, traumatic birth exposure appears to be associated with complications in newborn health.

Our study has several shortcomings. It uses a cross sectional design, which does not allow for longitudinal data. The study relies on self-reporting of childbirth and mental health. The web sample can introdcue self-selection, although our analysis uses between group comparison. Future prospective studies integrating objective and clinical information to assess CB-PTSD risk and using machine learning prediction models are warranted.

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Author Statement

SC contributed to the manuscript preparation and its final version and performed research related activities.

TE conducted the statistical analysis and wrote the Results section.

GM contributed to the manuscript preparation and writing.

MM contributed to related study activities and data entry.

RS contributed to related study activities and data entry.

BM contributed to related study activities and data entry.

AK contributed to the manuscript preparation, writing and editing of the manuscript.

SD is the principal investigator of the larger project. She conceptualized the study and the methodology and conducted the research. She provided oversight and leadership for the research activity planning and execution and manuscript writing.

Declaration of competing interest

No financial or personal relationship to disclose. All authors declare no conflict of interest that can influence the study and reported results.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2020.113090.

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